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## THE REGION OF GREATEST STEM THICKNESS IN RAPHIDOPHORA

FRANK C. GATES

To one accustomed to expect the greatest diameter in the oldest part of the stem, several tropical vines are interesting exceptions. Conspicuous in this respect are the araceous genera, *Raphidophora* and *Epipremnum*. Vines of *Raphidophora merrillii* Engl., growing at Los Baños, Philippine Islands, were chosen for a series of measurements to present the anomaly more clearly. Measurement of the thickness of the stem was taken at 5 cm. intervals beginning at the tip. Of the 37 plants employed the measurements of 7 are given in the accompanying table.

In each case it will be noted that the oldest part of the stem is not as thick as near the tip. In an extreme case the stem was more than seven times as thick near the tip as it was in the oldest region. In all cases the oldest region had the smallest diameter, which in the plants measured was 0.15 cm. The greatest thickness of any stem was 3.2 cm. At the tip, where the developing tissues have not yet reached their full size, the diameter of the stem is somewhat less than the maximum thickness, which however occurs within 15 cm. of the tip.

Further analysis makes this condition seem less anomalous. As the plant becomes larger the new leaves are larger, carry on more photosynthesis and thus furnish more food. This food is carried only very short distances in the stem. Absorption by clingfast roots, which occur along the whole stem, adds materially to the water supplied through the main root. Owing to the large number of side roots, the main root performs proportionally less and less work, yet is of value as it is usually rooted in the ground, where there is a permanent water supply. The side roots obtain their water supply from the water soaked up by the debris accumulated between them and the tree trunk upon which the vine is growing. This is entirely ample during the rainy season. It frequently happens that side roots may grow out and down to the ground. This further reduces the

demands upon the main root. Usually the old stem does not die off, although it may shrivel somewhat. If however, the old stem is cut off, the plant continues to develop, obtaining its water supply entirely from side roots.

The youngest part of the stem is the most fleshy. As it becomes older it becomes less fleshy, but retains approximately its maximum

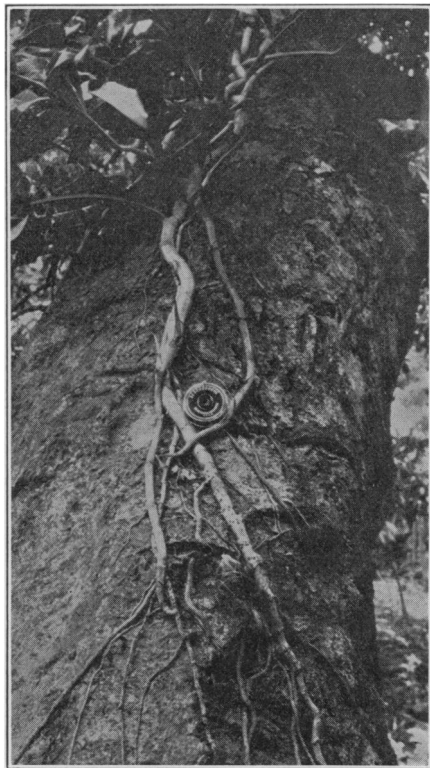


FIG. 1. Vines of *Raphidophora merrillii* Engl. growing on a leaning mango tree, illustrating the fact that the stem is progressively thicker in its younger portions. Los Baños, P. I., Nov. 3, 1913.

diameter. As the whole plant becomes larger the increasing in thickness of the newly forming stem continues, but at a much slower rate, so that a stem of *Raphidophora* 4 cm. in thickness is very unusual.

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TABLE OF STEM THICKNESS OF SEVEN PLANTS OF *Raphidophora merrillii* AT 5 CM.  
INTERVALS FROM THE TIP

From Tip	1	2	3	4	5	6	7
.....	.....	.....	2.4	1.6	.....	.3	1.5 cm.
5 cm.	.85	.85	2.8	1.8	.90	.3	2.0
10	1.00	1.10	2.6	2.4	.85	.6	2.8
15	.95	1.10	2.5	2.7	.80	1.0	2.6
20	.95	.80	2.1	3.0	.75	.9	2.4
25	.95	.95	1.8	2.9	.73	.9	2.3
30	.90	.80	1.7	2.7	.70	.8	2.2
35	.90	.65	1.6	2.6	.67	.8	2.1
40	.85	.60	1.5	2.7	.64	.7	2.0
45	.75	.60	1.3	2.6	.60	.7	1.8
50	.75	.55	1.3	2.5	.60	.7	1.8
55	.65	.50	1.1	2.4	.55	.7	1.5
60	.60	.....	1.1	2.5	.54	.6	1.3
65	.60	.....	1.1	2.4	.52	.5	1.2
70	.50	.....	1.0	2.4	.50	.....	1.0
75	.....	.....	1.1	2.3	.47	.....	1.0
80	.....	.....	0.9	1.9	.45	.....	.9
85	.....	.....	1.0	1.8	.43	.....	.9
90	.....	.....	0.8	1.5	.40	.....	.8
95	.....	.....	0.8	1.2	.39	.....	.7
100	.....	.....	0.8	1.2	.38	.....	.....
105	.....	.....	0.7	1.0	.35	.....	.....
110	.....	.....	0.8	1.0	.30	.....	.....
115	.....	.....	.....	.95	.25	.....	.....
120	.....	.....	.....	.80	.25	.....	.....
125	.....	.....	.....	.85	.20	.....	.....
130	.....	.....	.....	.80	.15	.....	.....
135	.....	.....	.....	.70	.....	.....	.....
140	.....	.....	.....	.70	.....	.....	.....
145	.....	.....	.....	.60	.....	.....	.....
150	.....	.....	.....	.60	.....	.....	.....
155	.....	.....	.....	.60	.....	.....	.....
160	.....	.....	.....	.50	.....	.....	.....
165	.....	.....	.....	.50	.....	.....	.....
170	.....	.....	.....	.45	.....	.....	.....
175	.....	.....	.....	.40	.....	.....	.....